BEST MANAGEMENT PRACTICES MANUAL

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CHAPTER 2 TEMPORARY SEDIMENT CONTROL MANAGEMENT

2.1 Introduction

The requirement that sediment control be initiated on all exposed soil surfaces within a given timeframe is an integral compliance component on virtually all construction and maintenance projects. Temporary sediment control best management practices (BMPs) are short-term measures that should only be considered during a period where areas are disturbed due to construction. When an emergency such as a slide or flood occurs, a temporary BMP should facilitate erosion protection, or at least be compatible with, long-term or permanent BMPs.

A temporary sediment control BMP is normally used for 1—6 months, or until a more permanent BMP is put into place. Temporary BMPs are used to reduce or eliminate erosion and are designed and installed to keep as much sediment on-site as possible.

The proper use of temporary BMPs allows for cleaner water runoff into the receiving waters such as streams, rivers, and lakes. Sediment control is the primary and initial consideration in a construction project that disturbs soil, and sediment collection should be the secondary consideration. If sediment control is performed correctly, there should be little or no sediment collection needed.

2.2 Temporary Sediment Control Management Goals

Temporary sediment control goals consist of:

1. **Perimeter Controls**
   a. Ensure that no sediment, or only a minimal amount, enters or leaves the project area.
   b. Treat or filter sediment-laden discharge waters, as many times as possible needed to meet standards, before leaving the project area.
2. **Controls within the Project**
   a. Maintain erosion and sediment control on cut-and-fill slopes and in the ditches or channels.
   b. Divert stormwater away from the project, especially disturbed areas.
   c. Protect all bodies of water (ponds, streams, wetlands, etc.).
3. **Final Product**
   a. Coordinate all temporary sediment controls to facilitate permanent measures.

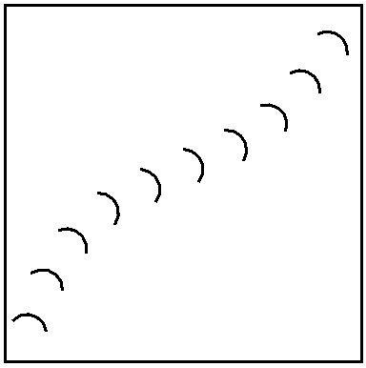
2.3 Best Management Practices (BMPs)

Temporary sediment control management involves the use of the following BMPs:

	Typical Highway Construction Activities																											
Temporary Sediment Control Management **Best Management Practices**	Demolish Pavement/Structures	Clear and Grub	Construct Access Road	Grading (inc. cut and fill slopes)	Channel Excavation	Channel Paving	Trenching/Underground Drainage	Underground Drainage Facility Installation	Drainage Inlet Modification	Utility Trenching	Utility Installation	Subgrade Preparation	Base Paving	AC Paving	Concrete Paving	Saw Cutting	Joint Sealing	Grind/Groove	Structure Excavation	Erect Falsework	Bridge/Structure Construction	Remove Falsework	Striping	Miscellaneous Concrete Work	Sound Walls/Retaining Walls	Planting and Irrigation	Contractor Activities	Treatment BMP Construction
SC-1 Dikes and Berms	X	X	X	X	X		X			X											X					X		X
SC-2 Check Dam	X	X		X	X		X																					X
SC-3 Gravel Bag Berm	X	X	X	X	X		X			X											X					X		X
SC-4 Street Sweeping and Vacuuming	X	X	X	X	X		X	X		X	X	X	X	X	X	X		X	X		X				X	X	X	X
SC-5 Sandbag Barrier	X	X	X	X	X		X			X		X							X		X					X		X
SC-6 Inlet/Outlet Protection	X	X	X	X	X		X	X	X	X		X	X			X	X	X	X								X	X
SC-7 Silt Fence	X	X	X	X	X		X			X		X							X		X					X		X
SC-8 Fiber Rolls	X	X	X	X	X		X			X											X					X		X
SC-9 Sediment/Desilting Basin	X	X	X	X	X																X					X		X
SC-10 Sediment Trap	X	X	X	X	X		X			X		X							X		X					X		X
SC-11 Temporary Construction Entrances		X	X	X																						X		X
SC-12 Temporary Roads		X	X	X																								
SC-13 Entrance/Outlet Tire Wash		X	X	X																						X	X	

SC-1 DIKES AND BERMS

Refer to: ITD Standards and Specifications for Highway Construction, Section 212
ITD Standard Drawings P-1-E & P-1-G



Standard Symbol

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☒ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☐ **Stream Protection**
- ☒ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

A temporary dike or berm is a ridge constructed of compacted soil, composted material, loose gravel, stone, crushed rock, sandbags, gravel bag barriers, or straw bales that intercepts and prevents runoff from entering a disturbed area, and diverts or directs the water to a controlled or stabilized drainage outlet. Dikes or berms can be located or placed immediately along cut or fill slopes, along the perimeter of a disturbed area or adjacent to streams to prevent water from a construction site entering a body of water, or high stream flows from entering the site.

Dikes or berms can also be used to direct water to slope drains, ditches, channels, sediment basins, or sediment traps.

Appropriate Applications

- Prevent runoff from entering or overflowing onto newly-constructed slopes, or intercept or divert runoff coming off the slope.
- Intercept runoff from upland undisturbed areas, and divert or direct runoff to a sediment basin or specified location.
- Intercept runoff and sediment from exposed disturbed areas, such as a newly-constructed road or slope, and filter sediment or redirect water to a slope drain, sediment basin, or other specified location.
- Install a perimeter around a disturbed area to protect adjacent undisturbed areas and prevent off-site runoff from entering the area.
- Still the water in larger sediment basins, allowing more sediment to settle.

- Prevent or reduce soil and wind erosion on newly-constructed slopes or disturbed areas.
- Prevent high water from streams, ponds, or lakes from entering a project.
- Prevent runoff from entering into bodies of water.
- Slow down the velocity of water with a waterbar in ditches.
- Divert runoff from roadway under construction with a waterbar to a roadside ditch.

Limitations

- Do not use dikes and berms in streams or channels.
- Some dikes and berms can be used to filter water, but dikes should not be used in active streambeds.
- Space, degree of slope, and access can be limiting or prohibitive factors for installing a dike or berm.
- Compost berms can be used in place of silt fence in areas with low to moderate runoff flows, in or near wetland or sensitive areas, as well as hard-to-access areas. Compost berms should not be used in areas with high concentrated surface runoff or high velocity flows such as ditches, channels, or streams.
- The dike or berm must be designed and constructed to avoid causing erosion or washout due to diverting the water and creating concentrated flow of high velocity runoff.
- Most dikes or berms should be used for anticipated minor runoff or small drainage areas and must be properly keyed and compacted to avoid washout.
- Sandbags or gravel bag barriers can usually be used to construct dikes or berms in more restricted or hard-to-access areas.
- Straw bale sediment barriers are to be used in emergencies only and require constant maintenance and repair. Straw bales, properly installed and anchored, can be placed uphill of a silt fence to act as a sediment barrier prior to water passing through a silt fence.

Design Parameters

- If soil is used for dikes or berms, the soil should consist of silt or clay intermixed with gravel or rock.
- The height of dikes or berms comprised of soil or rock should be sufficient to prevent water from overtopping the structure. For slopes 2H:1V or flatter, the width at the top of the dike or berm should be approximately twice the height. Maximum height should not exceed 5 feet.
- A compost dike or berm should be constructed with a minimum of 1.5-feet high by 3-feet wide for maximum water filtration ability and steeper slopes. Compost dikes or berms may also be left as a permanent filter or part of the natural landscape and may include a permanent seed mix to provide a natural project appearance.
- Geosynthetic liners should be placed on the uphill or upstream side and properly anchored to prevent erosion or washout of the dike or berm.

- If used as an interceptor/diversion structure, the berm should be built on the contour with a consistent and gradual gradient to a stabilized outlet.
- A channel or ditch may be constructed directly uphill from a dike or berm to aid in diverting and carrying water to a stabilized outlet.

Construction Guidelines

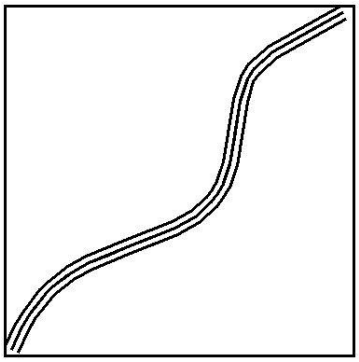
- Dikes and berms shall be graded in order to detour runoff to a stabilized outlet or other area using a gradient as flat as possible to prevent erosion.
- Compaction of the dike or berm material (if soil or rock) is required. If for any reason the compaction cannot be done, geosynthetic liners shall be used to avoid erosion and washout.
- Sandbags shall be stacked in an interlocking fashion to prevent water from flowing under or between bags.
- Straw bales shall be installed in a trench and anchored properly. The straw bales shall be laid on the sides opposite the bale twine, and any holes or gaps shall be plugged tightly with wedged straw. A geosynthetic liner, properly anchored, shall be used to increase the effectiveness of the straw bale dike or berm.
- Field adjustments shall be made as necessary to ensure proper performance.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Remove sediments retained by the filter berm once it has reached one-half of the exposed height of the berm, and dispose of properly to an approved site. Remove channel or ditch obstructions and dispose in an approved location.
- Remove the dikes or berms only after other permanent BMPs are in place and the site is stabilized. Sometimes the dike or berm may be left in place and continue operating after final acceptance of the project, or the maintenance section for that area may be required to remove the dikes or berms at a later date.
- If straw bales are used, check for failure, damaged bales, undercutting or end runs. Replace or repair as necessary.
- Straw bales shall be removed from the site after permanent BMPs are in place and the site is stabilized. Dispose of in an approved manner.

SC-2 CHECK DAM

Refer to: ITD Standards and Specifications for Highway Construction, Section 212.
ITD Standard Drawing P-1-D & P-2-B.
QPL Category: 212 Sediment Retention Fiber Rolls



Standard Symbol

Definition and Purpose

Check dams are small devices constructed of rock, sediment retention fiber rolls, gravel bags, sandbags, or other proprietary product placed across a natural or manmade channel or drainage ditch. A properly designed, constructed, and maintained check dam will reduce scour and channel erosion by reducing flow velocity and encouraging sediment settlement.

Check dams in conjunction with sediment basins are usually able to capture a large percentage of the sediments suspended in the water.

BMP Objectives

- ☐ **Perimeter Control**
- ☐ **Slope Protection**
- ☐ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☐ **Stream Protection**
- ☒ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Appropriate Applications

A check dam either filters the water for sediment as it passes through the dam or retains the water, allowing the sediment to settle while the water flows over the dam. Check dams may be installed:

- In small open channels.
- During the establishment of grass linings in drainage ditches or channels.
- In temporary ditches where the short length of service does not warrant establishment of erosion-resistant linings.

There are limited products or technologies available to construct an effective temporary check dam or channel liners, with the following practices being used:

- *Rock Check Dams* are constructed primarily of riprap and are more effective in ditches with gradients of 3H:1V or steeper, where the velocity of runoff is expected to be high, or in situations where the surface area exceeds 5 acres and drainage is funneled into a ditch or channel. An erosion control geotextile should be used in combination with rock check dams at the bottom or base of the rock check dam to prevent undercutting. In some instances,

erosion control geotextile should also be installed on the overflow portion of the dam to prevent erosion.

- *Sediment Retention Fiber Roll (see SC-8) Check Dams* are tubes containing straw, coconut fiber (coir), wood fiber (excelsior) mulch, or compost. The natural or organic material is wrapped in biodegradable netting. Fiber wattles, a type of sediment retention fiber roll, can be cut to length and used for ditch or channel protection and are easily installed. A series of stair steps made of wattles is effective in filtering and collecting water. Fiber wattles are degradable and can be left in place after construction.
- *Sandbag Check Dams* are suited for emergencies such as floods or slides where water needs to be diverted or channeled.
- *Straw Bale Check Dams* should only be used in emergencies and are better suited as a temporary berm or dike to capture or direct runoff where structural strength is not required. Straw bales do not filter sediment from runoff, but if installed properly, they can perform in the same manner as rock check dams.

Limitations

- Temporary check dams should be removed after the purpose is served, unless directed otherwise, or when permanent BMPs are in place and final stabilization is achieved.
- Check dams shall:
  - Not be used in live streams, except as allowed with proper approval and permitting.
  - Not be placed in channels that are already grass-lined unless erosion is expected, as installation may damage vegetation.
  - Require extensive maintenance following high velocity flows.
  - Promote sediment trapping, which can be re-suspended during subsequent storms or removal of the check dam if not properly maintained.
  - Not be constructed from silt fence.
  - Be constructed of straw bales only in emergencies.
- Poor installation and maintenance are often the cause of ineffective or poor results using check dams and channel liners.
  - Fiber wattles are ineffective on steep gradients of 1.5H:1V or steeper or in areas with high runoff.
  - Rock check dams are usually the most effective check dams to use, but the correct rock size and combination must be available and installed properly. Rock size should vary from 1 inch to 8 inches, with 8 inches making up 30 percent or more of the mix.
  - Channel liners are not suitable when used in ditches or channels with steep sides or where the soils are gravelly or not compacted, because the soil may not hold the liner in place.

Design Parameters

- Check dams shall be placed at a distance and height to allow small pools to form behind them. The check dams shall be installed approximately 6 feet from the outfall device and at regular intervals based on slope gradient and soil type.
- For installation of multiple check dams, backwater from downstream check dam shall reach the toe of the upstream dam.
- High flows shall safely flow over the check dam without an increase in upstream flooding or damage to the check dam.
- Where grass is used to line ditches, check dams shall be removed when grass has matured sufficiently to protect the ditch or swale.
- Rock shall be placed individually by hand or by mechanical methods (no dumping of rock) to achieve complete ditch or swale coverage.
- Sediment retention fiber rolls may be used as check dams if approved by the Engineer. Fiber rolls are discussed in SC-8.
- Stable inlets and outlets shall be designed and constructed prior to installation of check dams.
- When designing check dams in ditches or channels, the following factors shall be considered:
    - *Drainage area, gradient, and velocity:* When deciding which application to install, the size of the area to be drained, the gradient or slope of the ditch, and anticipated high velocity runoff must all be considered.
    - *Spacing:* Check dams should be spaced so that the toe of the upstream check dam is never lower than the top of the overflow of the next downstream check dam.
    - *Height:* The center of the check dam should be 6 to 10 inches lower than the top of the outside edge to form a weir for the overflow. The top of the outside edges should be at least 6 inches lower than the roadway, banks, or back slope to prevent water from flowing onto the roadway or undercutting the banks.
    - *Anchoring and stabilization:* Undercutting shall always be considered, regardless of the type of check dam being used. For the installation of sediment retention fiber rolls, a trench of 3 to 5 inches deep shall be dug to lay the roll in. Excavated soil shall be placed on the upstream side of the wattle and compact. The fiber wattles shall be anchored with wood stakes according to manufacturer's recommendations to properly secure the wattles in the trench.
- If straw bales are used, the bales shall be placed in a trench backfilled on the upstream side and compacted. Rock 1 to 3 inches shall be placed in the overflow area both upstream and downstream (similar to a rock check dam) to provide additional stability and strength. An overflow shall be formed in the center of straw bale check dams.

- Careful inspection is important during installation of check dams and channel liners. Refer to special contract provisions or plans to ensure that check dams and liners are installed and perform properly during their lifetime.
- Sediment trap basins shall be constructed upstream of the check dams to increase the effectiveness of sediment capture.
- **Rock Check Dams:** May be placed on erosion control geotextile to avoid undercutting. The sides shall also be lower than the adjoining banks, roadway, or backslope. Lining the upstream side of the check dam slope and overflow with a geosynthetic material is highly recommended.
- **Straw Bales:** Straw bales shall be used as ditch checks only in case of emergencies, or as temporary dikes or berms to direct the flow of water. If straw bales are used, refer to design parameters.
- **Sandbags:** All bags shall be inspected to ensure a proper seal. Place the bags in an interlocking pattern to assure proper sealing and stability.
- **Channel liners** shall be installed on side slopes of 3H:1V or flatter and in channels with a low-flow velocity. The material (geosynthetic or jute matting) should be porous, long lasting (longer than one year) and flexible.
- **Channel Lining:** Manufacturer's installation recommendations shall be followed and, in particular, include:
  - *Site preparation:* Shape, grade, and compact the bottom and banks as required for a smooth fit. Remove rocks, clods, sticks, and other materials that prevent positive contact with the soil surface. Completing contact of channel liner with the soil surface is critical for satisfactory performance.
  - *Side ditches or channels:* Treat in the same manner as the main ditch or channel.
  - *Channel liner application:* Start at the upstream end of the channel and continue down grade.
  - *Channel liner overlap:* At least 3 feet with the end of the upstream liner overlapping the top of the next lower liner. The top end of the lower liner shall be buried at least 6 inches. Both the top and bottom liner shall be securely anchored in the area of the overlap. The outer edges of the channel liner shall be buried in a trench at least 12 inches and properly anchored.
- Field adjustments shall be made as necessary to ensure proper performance.

Qualified Products List Criteria

See SC-8 (Fiber Rolls).

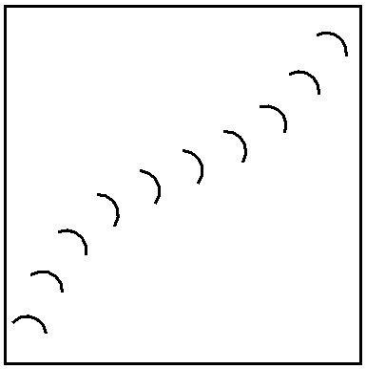
Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Make any repairs necessary to keep the check dams in good working order and check for signs of undercutting.

- Remove accumulated debris and sediments from behind the check dams when sediment reaches a depth of one-half the original height of the dam and prior to permanent seeding or soil stabilization. Dispose of all materials properly at an approved site.
- On sediment retention fiber rolls, clean out accumulated sediment or replace the roll as necessary.
- Replace rock as necessary to maintain the correct height of rock check dams.
- Replace sandbag dam fabric as necessary.
- After channel lining is installed, make sure all liner is in contact with the soil in all places and that critical areas are securely anchored.
- Remove check dam when no longer needed or when directed by the Engineer.

SC-3 GRAVEL BAG BARRIER

Refer to: ITD Standards and Specifications for Highway Construction, Section 212.



Standard Symbol

Definition and Purpose

A gravel bag barrier consists of a single row of gravel bags that are installed end-to-end to form a barrier across a slope to intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide some sediment removal. Gravel bag barriers can also be used where flows are moderately concentrated, such as ditches, swales, and storm drain inlets to divert and/or detain flows.

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☒ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☐ **Sediment Trapping**
- ☒ **Stream Protection**
- ☒ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Appropriate Applications

- Along the perimeter of a site.
- Along streams and channels.
- Below the toe of exposed and erodible slopes.
- Down slope of exposed soil areas.
- Around stockpiles.
- Where flows are moderately concentrated, such as ditches, swales, and storm drain inlets.
- Across channels in constructing check dams or diversions.
- Parallel to a roadway to keep sediment off paved areas.
- At the top of slopes to divert runoff away from disturbed slopes.
- To divert or direct flow or create a temporary sediment basin.
- During construction activities in channels when the contributing drainage area is less than 5 acres.
- When extended construction period limits the use of either silt fences or straw bale barriers.
- When site conditions or construction sequencing require adjustments or relocation of the barrier to meet changing field conditions and needs during construction.

- At grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

Limitations

- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor-intensive.
- Burlap bags have limited durability for long-term projects.
- When used to detain concentrated flows, maintenance requirements increase.

Construction

- When using as a linear control for sediment removal:
  - Install along a level contour.
  - Turn ends of gravel bag row upslope to prevent flow around the ends.
  - Generally, use gravel bag barriers in conjunction with temporary soil stabilization controls up slope to provide effective control.
- When using for concentrated flows:
  - Stack gravel bags to required height using a pyramid approach.
  - Upper rows of gravel bags shall overlap joints in lower rows.
- Construct gravel bag barriers with a setback of at least 3 feet from the toe of a slope. Where it is not practical due to specific site conditions, the gravel bag barrier may be constructed at the toe of the slope, but shall be constructed as far from the toe of the slope as practical to allow for maintenance access.

Design Parameters

- **Bag Material:** Bags shall be woven polypropylene, polyethylene, or polyamide fabric, minimum unit weight 4 ounces per square yard; mullen burst strength exceeding 300 psi in conformance with the requirements in ASTM designation D3786; and ultraviolet stability exceeding 70 percent in conformance with the requirements in ASTM designation D4355.
- **Fill Material:** Gravel shall be between 0.4 and 0.8 inch in diameter and shall be clean and free from clay balls, organic matter, and other deleterious materials. The opening of gravel-filled bags shall be between 28 and 48 pounds in mass. Fill material is subject to approval by the Engineer.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Reshape or replace gravel bags as needed.
- Repair washouts or other damages as needed.
- Removed sediment shall be incorporated in the project at locations designated by the Engineer or disposed of in an approved manner.

- Remove gravel bag berms when no longer needed. Remove sediment accumulation, and clean, re-grade, and stabilize the area.

SC-4 STREET SWEEPING AND VACUUMING

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☐ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☐ **Stream Protection**
- ☐ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

Street sweeping and vacuuming practices remove tracked sediment to prevent the sediment from entering a storm drain or watercourse.

Appropriate Applications

These practices are implemented anywhere sediment is tracked from the project site onto public or private paved roads, typically at construction entrances and exits.

Limitations

Sweeping and vacuuming may not be effective when soil is too wet or muddy; however, the soil should be moist to avoid dust.

Design Parameters

- Visible sediment tracking shall be swept and/or vacuumed.
- If not mixed with debris or trash, the removed sediment shall be incorporated back into the project as approved.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Sweep tracked sediment as needed, or as required by the Engineer.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently to maintain proper contact with the ground and maximize efficiency of sweeping operations.

  After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

SC-5 SANDBAG BARRIER

Refer to: ITD Standards and Specifications for Highway Construction, Section 212.

Photograph to come.

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☒ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☐ **Stream Protection**
- ☐ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

A sandbag barrier is a temporary linear sediment barrier consisting of stacked sandbags, designed to intercept and slow the flow of sediment-laden sheet flow runoff. Sandbag barriers allow sediments to settle from runoff before water leaves the construction site.

Appropriate Applications

This BMP may be implemented on a project-by-project basis in addition to other BMPs when determined necessary and feasible by the Engineer.

Appropriate locations for sandbag barriers are:

- Along the perimeter of a site.
- Along streams and channels.
- Below the toe of exposed and erodible slopes.
- Down slope of exposed soil areas.
- Around stockpiles.
- Across channels to serve as a barrier for utility trenches or provide a temporary channel crossing for construction equipment, to reduce stream impacts.
- Parallel to a roadway to keep sediment off paved areas.
- At the top of slopes to divert roadway runoff away from disturbed slopes.
- Along the perimeter of vehicle and equipment fueling and maintenance areas or chemical storage areas.

Appropriate applications for sandbag barriers are outlined below.

- To divert or direct flow or create a temporary sediment/desilting basin.
- During construction activities in stream beds when the contributing drainage area is less than 5 acres.

- When extended construction period limits the use of either silt fences or straw bale barriers.
- To capture and detain non-stormwater flows until proper cleaning operations occur.
- When site conditions or construction sequencing require adjustments or relocation of the barrier to meet changing field conditions and needs during construction.
- To temporarily close or continue broken, damaged, or incomplete curbs.

Limitations

- The drainage area upstream of the barrier shall be limited to 5 acres.
- Degraded sandbags may rupture when removed, spilling sand.
- Installation can be labor-intensive.
- There is limited durability for long-term projects.
- When used to detain concentrated flows, maintenance may increase.

Design Parameters

- **Bag Material:** Bags shall be woven polypropylene, polyethylene, or polyamide fabric, minimum unit weight 4 ounces per square yard; mullen burst strength exceeding 300 psi in conformance with the requirements in ASTM designation D3786; and ultraviolet stability exceeding 70 percent in conformance with the requirements in ASTM designation D4355.
- **Fill Material:** Sand shall be clean and free from clay balls, organic matter, and other deleterious materials. Fill material is subject to approval by the Engineer.

Construction Guidelines

- When used as a linear sediment control:
  - Install along a level contour.
  - Turn ends of sandbag row upslope to prevent flow around the ends.
  - Generally, use sandbag barriers in conjunction with temporary soil stabilization controls upslope to provide effective erosion and sediment control.
- Construct sandbag barriers with a set-back of at least 3 feet from the toe of a slope. Where it is determined to be not practical due to specific site conditions, the sandbag barrier may be constructed at the toe of the slope but shall be constructed as far from the toe of the slope as practicable.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Reshape or replace sandbags as needed, or as directed by the Engineer.
- Repair washouts or other damages as needed, or as directed by the Engineer.
- Removed sediment shall be incorporated in the project at locations designated by the Engineer or disposed of as approved.

- Remove sandbags when no longer needed. Remove sediment accumulation, and clean, re-grade, and stabilize the area.

SC-6 INLET/OUTLET PROTECTION

Refer to: ITD Standard Specifications, Sections 212, 640, 711, and 718.
ITD Standard Drawings P-1-A and P-1-H.
QPL Category: 212 Inlet Protection

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☐ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☐ **Stream Protection**
- ☐ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

Temporary inlet and outlet treatment of runoff water ensures that the water leaving the construction site has a reduced sediment load.

- **Inlet treatment** is accomplished by either filtering the water or using sediment basins prior to entering an inlet structure or channel in the same manner as ditch check dams, with several added options.
- **Outlet treatment** uses the same procedure as ditch check dams and, depending on expected velocity of water and gradient, is constructed primarily of either fiber wattles or rock check dams. One added feature is that a basin lined or filled with riprap can be constructed to break the impact of water after it leaves a culvert or other conveyance system.

Appropriate Applications

Inlet Protection

- Inlet protection is recommended on any structure that conveys water away from a construction site.
- Storm drain inlet treatment is used where:
  - A permanent storm drain structure is being constructed on-site and there is danger of sediment silting or filling in the structure prior to site stabilization and placement of permanent BMPs, or where ponding around the inlet structure could interfere with traffic within the site.
  - Sediment-laden runoff may enter an inlet.

- Sediment filtering of the runoff used in combination with sediment basins, or other erosion and sediment control BMPs can be effective in reducing the sediment load.
- The inlet structure may be above ground, such as a slope drain or a constructed drainage inlet (permanent) that feeds an underground drainage system or culvert.
- Recommended inlet practices consist of:
    - Fiber wattles, placed upstream to or around the inlet
    - Riprap and erosion control geotextile
    - Sediment basin upstream of the inlet
    - Cinder block and graded aggregate
    - Graded aggregate and erosion control geotextile
    - Sandbags or gravel bag barriers
    - Framework with silt fence and wire mesh
    - Approved pre manufactured inlet filter devices

Outlet Protection

Outlet protection should be comprised of riprap and riprap/erosion control geotextile that is installed at the outlets of all conveyance systems, sediment trap basins, ditches or channels where the velocity of flow may cause erosion in the receiving area.

Limitations

- **Inlet treatment** measures require constant monitoring and maintenance. Where approaches to inlets are paved, special consideration and practices such as sandbags may be needed to reduce water velocity.
    - Straw bales are not an acceptable application for inlet treatment, except for emergencies.
    - Silt fencing is not an acceptable application for inlet treatment without framework and wire mesh backing.
    - Gravel bag barriers for inlet protection are applicable when sheet flows or concentrated flows exceed 0.5 cubic feet per second, and it is necessary to allow for overtopping to prevent flooding.
    - Fiber rolls and foam barriers are not appropriate for locations where they cannot be properly anchored to the surface.
    - Inlet protection requires an adequate area for water to pond without encroaching upon traveled way and should not present itself to be an obstacle to oncoming traffic.
    - Inlet protection may require other methods of temporary protection to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

- Sediment removal may be difficult in high-flow conditions or if runoff is heavily sediment-laden. If high-flow conditions are expected, other onsite sediment trapping techniques (e.g., check dams) shall be used in conjunction with inlet protection.
- For drainage areas larger than 1 acre, runoff shall be routed to a sediment trapping device designed for larger flows. See SC-9 (Sediment/Desilting Basin) and SC-10 (Sediment Trap).
- Traffic obstruction and durability must be considered when choosing inlet protection in areas with expected traffic.

- **Outlet treatment** measures require the right size and thickness of riprap to be effective, depending on flow velocity, soil conditions and location.

Design Parameters

- **Inlet:** The area immediately surrounding the inlet should be flat as possible.
  - Sediment retention fiber rolls can be effective to filter low-velocity-flow runoff, which in most instances provides a continuous filtering barrier around the inlet. For higher velocity flows, masonry block can be installed between the roll and the inlet to provide added strength and stability. The masonry block shall be laid on its flat side so water can pass through the openings in the block.
  - If graded aggregate is used in lieu of a sediment retention fiber roll, wire mesh with a 0.4- to 0.6-inch opening shall be installed between the masonry block and the aggregate. The graded aggregate should be washed gravel 0.75 to 1.2 inches in diameter, with less than 5 percent being 4.75 mm (No. 4 sieve) in diameter or smaller. A sediment basin with a depth of 12 to 20 inches shall be constructed upstream to the inlet to assist in ponding the water and to allow the sediment to settle out prior to passing through the fiber wattle or aggregate.
- **Outlet:** The outlet should be located to discharge onto a stabilized area or into a channel to prevent erosion.
  - Unless otherwise specified, all riprap used in an outlet shall be 6 inches or larger.
  - An erosion control geotextile should be installed prior to the placement of the riprap, with the riprap placed directly on top of the geotextile.
  - A basin on the discharge side of the outlet may be needed to dissipate water velocity and prevent erosion.

Construction Guidelines

- **Inlet:** Leave inlet treatment in place and operational until the drainage area is completely stabilized with a more permanent BMP. The measure may be left in place past final acceptance of the project. Make field adjustments as necessary to assure proper performance.
  - Level the area immediately surrounding the inlet as much as possible.
  - Install a dike or berm on the downstream side of the inlet to avoid bypassing the inlet after the installation of the filtering measure.

- Anchor and stabilize the filtering measure properly to avoid washout or undercutting.
- Construct a sediment basin upstream–the width, size, and depth to be determined by the availability of room.
- Install wire mesh with a 0.4- to 0.6-inch opening over the inlet (grate) to prevent rock from entering the inlet. Extend the wire mesh over the edges of the inlet (grate) by a minimum of 12 inches.

- **Outlet:** Make field adjustments as necessary to assure proper performance.
  - Construct outlets concurrently with pipe, culvert, dikes, berms, and inlets before allowing water flows to pass over or through the outlet.

Qualified Products List Criteria

Table 1
Pre-manufactured Inlet Protection Devices, Qualified Products List Criteria

Property Minimum Average Roll Value (in weaker principal direction)	Test Method	Geotextile Bag Inlet Insert	Sediment Mat	Other
Grab tensile Strength lb(N)	ASTM D 4632	200 (890)	200 (890)	44
Grab Tensile Elongation (%)	ASTM D 4632	15	N/A	N/A
Puncture Strength lb (N)	ASTM D 4833	80 (355)	80 (355)	N/A
Trapezoidal Tear lb(N)	ASTM D 4533	50 (222)	50 (222)	N/A
Apparent Opening Size (AOS) (Standard Sieve)	ASTM D 4751	#20 or finer (.85 mm)	#20 or finer (.85 mm)	#20 or finer (.85 mm)
Permittivity, s^{-1}	ASTM D 4491	0.5 (min)	0.5 (min)	0.5 (min)
Ultraviolet (UV) Radiation Stability	ASTM D 4355	70% Strength Retained @ 150 hrs.	70% Strength Retained @ 150 hrs.	70% Strength Retained @ 150 hrs.

Maintenance and Inspection

Inlet

- Conduct inspections as required by the NPDES permit or contract specifications.
- Make any necessary repairs to ensure the measure is in good working order.
- Install new or replace fiber wattles if wattles are full of sediment.
- Remove accumulated sediment in the sediment trap basin when filled to half the depth of the basin.
- Dispose of the sediment properly.

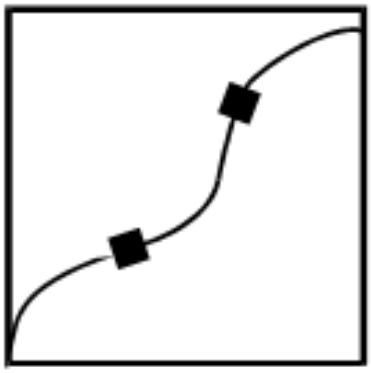
- Remove any rock or debris that has been deposited on the grate and wire mesh to prevent further clogging of the entrance to the inlet.

Outlet

- Conduct inspections as required by the NPDES permit or contract specifications.
- Make any necessary repairs to ensure the measure is in good working order.
- Remove accumulated sediment from the sediment trap basin.
- Dispose of the sediment as approved.

SC-7 SILT FENCE

Refer to: ITD Standard Specifications, Sections 212 and 718
ITD Standard Drawing P-1-B
QPL Category: 212 Silt Fence



BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☒ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☒ **Stream Protection**
- ☐ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

Perimeter protection (silt fences) consists of permeable geotextile material stretched and attached to supporting posts that assists in sediment containment by capturing/intercepting most of the eroded soil particles (sediment) and slowing the runoff velocity to allow particle settling. Welded wire fabric backing may be necessary, with several types of geotextile commonly used.

Appropriate Applications

The fences should remain in place until the disturbed area is permanently revegetated and stabilized.

- Downslope perimeter of a disturbed area to intercept sediment.
- Below the toe of exposed and erodible slopes while allowing water to pass through.
- Toe of fills.
- Downhill side of large cut areas, along streams and channels.
- At natural drainage areas to reduce the quantity of sediment and dissipate flow velocities to downstream areas.
- At grade breaks on cut or fill slopes and above interceptor dikes, berms, channels, or ditches.

Limitations

- Shall not be used at the top of a slope.

- Shall not be used in a live stream, ditch, channel, or drainage way or where soil conditions prevent a minimum toe-in depth of 6 inches or installation of support posts to a minimum depth of 24 inches.
- Are not effective unless trenched and keyed in.
- Are not intended for use as mid-slope protection on slopes steeper than 1V:4H.
- Must be maintained.
- Must be removed and disposed of.
- Shall not be used below slopes subject to creep, slumping, or landslides.
- Shall not be used in streams, channels, drain inlets, or anywhere flow is concentrated.
- Shall not be used to divert flow.
- Compost berms should not be used in areas with high-concentrated runoff or high-velocity flows such as ditches, channels or streams.

Design Parameters

Silt fences will be designed with the following parameters:

- Slope of area draining to silt fence shall be less than 1V:1H.
- Silt fences shall not be used in concentrated flow areas.
- For slopes steeper than 1V:2H and that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to install additional protection immediately adjacent to the bottom of the slope, prior to installing silt fence. Additional protection may be a chain link fence or a cable fence.
- For slopes adjacent to water bodies or Environmentally Sensitive Areas (ESAs), additional temporary soil stabilization BMPs shall be used.

Materials

- Wood stakes shall be commercial quality lumber of the size and shape shown on the plans. Each stake shall be free from decay, splits or cracks longer than the thickness of the stake, or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.
- Bar reinforcement may be used, and its size shall be equal to a number four (4) or greater. End protection shall be provided for any exposed bar reinforcement.
- Staples used to fasten the fence fabric to the stakes shall be not less than 1.75 inches long and shall be fabricated from 0.06-inch or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence shall be 0.12-inch or heavier wire. Galvanizing of the fastening wire is not required.

Qualified Products List Criteria

See QPL Category: 212 Silt Fence.

Installation

In most instances, silt fences should be used on the toe of a slope or disturbed areas where surface water will run off the construction site. Install silt fence perpendicular to the flow of water. Install perimeter protection after clearing and grubbing and before excavating haul roads, benches, or any soil-disturbing construction activity.

- Generally, silt fences shall be used in conjunction with soil stabilization source controls up slope to provide effective erosion and sediment control.
- Trenches shall not be excavated wider and deeper than necessary for proper installation of the temporary linear sediment barriers.
- Excavation of the trenches shall be performed immediately before installation of the temporary linear sediment barriers.
- Silt fences shall be constructed with a set-back of at least 3 feet from the toe of a slope. Where a silt fence is determined not to be practical due to specific site conditions, the silt fence may be constructed at the toe of the slope, but shall be constructed as far from the toe of the slope as practical.
- Cross barriers shall be a minimum of one-third and a maximum of one-half the height of the linear barrier.
- Geotextile shall not be attached to trees.
- When welded wire fabric is used, the wire fabric shall be fastened to the upslope side of the posts using heavy-duty wire staples, tie wires, or hog rings. The wire fabric support shall be extended to the bottom of the trench.
- Designated vegetated areas shall not be disturbed.
- Field adjustments shall be made as necessary to ensure proper performance.

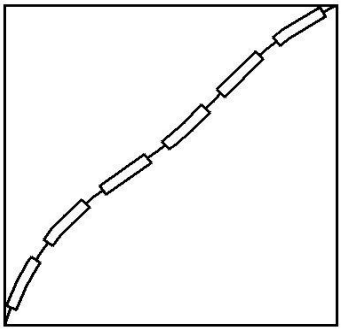
Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Silt fences that are damaged and become unsuitable for the intended purpose, as determined by the Engineer, shall be removed from the site of work, disposed of outside the highway right-of-way in conformance with the Standard Specifications, and replaced with new silt fence barriers.
- If concentrated surface flow occurs after installation, take corrective action by placing rock berms or other corrective measures in the areas of concentrated flow to direct and spread the flow.
- Remove the silt fence when no longer needed, after final acceptance of the project, or as required by the Engineer. When the silt fence is removed, cut the geotextile at ground level, remove the wire and post, fill and compact post holes and anchorage trench, spread the sediment, prepare for seeding, and grade fence alignment to blend with adjacent ground.

- Repair undercut silt fences.
- Repair or replace split, torn, slumping, or weathered fabric. Holes, depressions, or other ground disturbance activities caused by the removal of the temporary silt fences shall be backfilled and repaired in conformance with the Standard Specifications.

SC-8 SEDIMENT RETENTION FIBER ROLLS

ITD Standard Drawing P-1-B
QPL Category: 212 Sediment Retention Fiber Rolls



Standard Symbol

Definition and Purpose

A sediment retention fiber roll consists of wood excelsior, rice or wheat straw, compost, or coconut fibers that are rolled or bound into a tight tubular roll and placed on the toe and face of slopes to intercept runoff, reduce its flow velocity, release the runoff as sheet flow and provide removal of sediment from the runoff. Sediment retention fiber rolls may also be used for inlet protection and as check dams or shoreline protection under certain situations. Sediment retention fiber rolls include degradable fiber wattles, degradable logs, and compost socks.

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☒ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☒ **Stream Protection**
- ☐ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Appropriate Applications

- This BMP may be implemented on a project-by-project basis with other BMPs when determined necessary and feasible by the Engineer.
- Sediment retention fiber rolls may be used as check dams in unlined ditches if approved by the Engineer (refer to SC-2 [Check Dams]).
- Sediment retention fiber rolls may be used for drain inlet protection if approved by the Engineer (refer to SC-6 [Inlet/Outlet Protection]).
- Degradable logs may be used for shoreline protection as approved.
- Sediment retention fiber rolls may be located:
  - Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
  - Below the toe of exposed and erodible slopes.
  - Down-slope of exposed soil areas.
  - Around temporary stockpiles.

- Along the perimeter of a project.

Limitations

- Erosion may occur if sediment retention fiber roll is not adequately trenched in.
- Sediment retention fiber rolls at the toe of slopes greater than 1:5 may require the use of 20-inch-diameter rolls or installations achieving the same protection (i.e., stacked smaller diameter fiber rolls, etc.).
- Sediment retention fiber rolls may be used for drainage inlet protection if they can be properly anchored.
- Sediment retention fiber rolls are difficult to move once saturated.
- Sediment retention fiber rolls could be transported by high flows if not properly staked and trenched in.
- Sediment retention fiber rolls have limited sediment capture zone.
- Sediment retention fiber rolls shall not be used on slopes subject to creep, slumping, or landslide.

Qualified Products List Criteria

- All sediment retention fiber roll products shall meet the State of Idaho State Department of Agriculture Seed Laboratory or the North American Weed Management Association (NAWMA) noxious weed-free certification requirements prior to approval.
- Stakes shall be made from untreated Douglas fir, hemlock, or pine species and shall be a minimum of 1x1x24 inches.

Degradable Fiber Wattles

Degradable fiber wattles shall be manufactured from natural straw, coir (coconut), composted material, wood fibers, or a combination of; and wrapped in approved degradable netting made of plastic, natural fiber such as jute, sisal, cotton, hemp, or burlap. All material including netting shall have a life expectance of approximately one year. Degradable fiber wattles shall have a minimum diameter of 8 in. Degradable fiber wattles that are 8 inches to 11 inches in diameter shall have a minimum weight of one pound per linear foot. Fiber wattles with a diameter greater than 11 inches shall have a minimum weight of three pounds per linear foot. The ends shall be secured tightly with degradable twine.

Degradable Logs

Degradable logs shall be made of 100 percent durable coconut (coir) fiber or other approved material. Material shall be uniformly compacted within woven netting made of coir twine with minimum strength of 80 lbs tensile strength. The netting shall have nominal 2 inch by 2 inch openings. The log segments shall have a maximum length of 20 feet and a minimum density of 7 lbs/cf. Rope ties shall be of 1/4 inch diameter commercially available hemp rope. All material including netting shall have a life expectance of greater than one year.

Compost Sock

Compost sock shall have a minimum diameter of 8 inches and shall be free from any type of preservative. Sock shall be a mesh tube, oval to round in cross section and shall be clean, evenly woven, and free of encrusted concrete or other contaminating materials and free from cuts, tears, broken or missing yarns and thin, open or weak places. Sock shall have a minimum tensile strength of 44 psi. Sock shall be composed of either degradable plastic or polyester netting or composed of biodegradable jute, sisal, burlap, or coir fabric. Sock shall have a minimum durability of one year after installation.

Compost material shall meet the following criteria:

- Provide compost that is the result of the biological degradation and transformation of plant-derived materials under controlled conditions designed to promote aerobic decomposition.
- Provide compost that is stable with regard to oxygen consumption and carbon dioxide generation. Stability shall be 7 or below in accordance with Test Methods for Evaluation of Compost and Composting (TMECC) 05.08-B, Carbon Dioxide Evolution Rate."
- Provide compost that is mature with regard to its suitability for serving as a soil amendment or in erosion and sediment control applications. Maturity shall be greater than 80 percent in accordance with TMECC 05.05A, "Germination and Root Elongation."
- Provide compost that is certified in the State of Idaho by an authorized (or approved) state agency and declared "noxious weed free."
- Provide compost that has a moisture content that has no visible free water or dust produced when handling the material.
- Provide compost that is has a pH shall be between 6.0 and 8.2 when tested in accordance with TMECC 35 04.11-A, "1:5 Slurry pH."
- Provide compost that has a manufactured inert material (plastic, concrete, ceramics, metal, etc.) of the compost less than 0.5 percent on a dry weight or volume basis, whichever provides for the least amount of foreign material.
- Provide compost that has a minimum organic matter of the compost shall be 40 percent dry weight basis as determined by TMECC 05.07A, "Loss-On-Ignition Organic Matter Method."
- Provide compost that has a soluble salt contents of the compost shall be less than 3.0mmhos/cm tested in accordance with TMECC 04.10-A, "1:5 Slurry Method, Mass Basis."
- Provide a compost product that is composed of a minimum of 65 percent by volume from recycled plant waste. A maximum of 35 percent by volume of other approved organic waste and/or biosolids may be substituted for recycled plant waste.
- Test samples using the Solvita Compost Maturity Test by the Contracting Agency at the Engineer's discretion. Provide fine compost that has a score of 6 or greater on the Solvita Compost Maturity Test. Provide coarse compost that has a score a 5 or greater on the Solvita Compost Maturity Test.

Removal

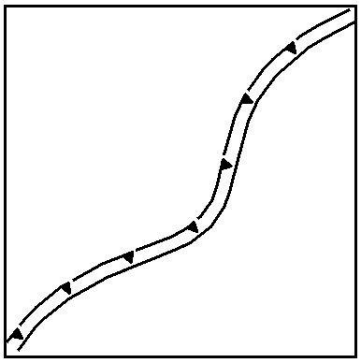
- Degradable fiber wattles and degradable logs are typically left in place.
- Compost socks are typically removed as directed by the Engineer.
- If sediment retention fiber rolls are removed, sediment accumulation shall be collected and disposed of, and holes, trenches, depressions, or any other ground disturbance shall be filled and compacted to blend with adjacent ground.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Repair or replace split, torn, unraveling, or slumping sediment retention fiber rolls.

SC-9 SEDIMENT/ DESILTING BASIN

Refer to: ITD Standard Specifications, Section 212.
ITD Standard Drawings P-1-C, P-1-D, and P-4-A.



Standard Symbol

BMP Objectives

- ☐ **Perimeter Control**
- ☐ **Slope Protection**
- ☐ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☒ **Stream Protection**
- ☐ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

Sediment/desilting basins are one of the most effective sediment control measures. A sediment/desilting basin is a temporary basin formed by excavating and/or constructing an embankment so that sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out before the runoff is discharged.

Appropriate Applications

Sediment basins may be appropriate in the following applications:

- At the toe of slopes or embankments where slope drains discharge.
- At the lower end of waste areas or borrow pits.
- At the outlet of perimeter controls.
- At the outlet of any structure discharging sediment-laden runoff.
- Upstream to an inlet, or channel ditch check dam.
- Upstream to the outlet of a staging or storage area.
- One or a series of small basins constructed along a concentrated runoff flow path.

Limitations

- May not be feasible in narrow rights-of-way or limited areas due to lack of space.

- Normally collect only sand-sized or larger particles, with fine clay-sized particles passing through. Because finer silts or clays may not settle out, additional erosion control measures may be constructed downstream to minimize sediment release.
- Require large surface areas to permit infiltration and settling of sediment.
- May not be applicable in highly permeable soils.
- Cannot be used in active stream channels.
- May be a drowning hazard and protective fencing may be required.

Design Parameters

- Design of the sediment basin should be based upon the total area being drained. Consideration needs to be given to the volume of sediment, the percent of sediment load to be removed, particle size, and estimated peak rates of runoff.
- Sediment basin efficiency, in respect to design of the size (volume) of the basin and sediment recovery, should be based on an assessment of potential downstream impact. Runoff should enter the basins as far from the outlet as possible to maximize retention time.
- The volume of small sediment basins that are installed upstream of a ditch or channel check dam and outlet or inlet structures is based more on the availability of space to excavate and maintain the basin.
- The volume of larger sediment basins requires more evaluation and calculation. The recovery and deposit of sediment particles in a sediment basin is a function of the fall velocity (sedimentation rate) of the particles, the basin length and width, and the discharge per meter of basin width.
- The volume of a sediment trap basin should be at least 1,800 cubic feet per acre of total drainage area (0.5 inches over the watershed) for areas less than 10 acres. Disturbed areas greater than 10 acres within the same drainage basin should have a basin with a capacity of 250 cubic meters per hectare of total drainage area 3,600 cubic feet per acre drained 1 inch over the watershed to meet the NPDES regulations.
- The basin may be designed to include baffles (berms) or other deflectors, such as floating sediment barriers, to spread and reduce the velocity of water flow throughout the basin. An emergency spillway must be included in the basin, in case the overflow is plugged for some reason. The emergency spillway structures will be designed on a site-specific basis.

Installation

- Locate and construct temporary sediment basin as early as possible in the construction phase, especially after installation of other BMPs, such as slope drains, ditch check dams, or outlets and inlets.
- Clear existing vegetation and other debris if present in the basin construction area
- Construct the sediment basin in an area where there is sufficient room and topography to allow for access and clean-out of the basin.

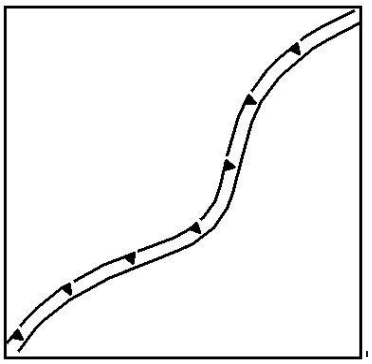
- The banks or slope of the sediment basin may require that geosynthetic liner or jute matting be installed to protect against erosion. Care must be taken not to disturb the liners or matting during clean out of the basin. A temporary soil stabilization or erosion control surface application may be used to stabilize the surrounding area.
- If berms or dikes with appropriate outlets are constructed, care must be taken to assure proper compaction as specified.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Keep the sediment trap basin operational and maintained until the drainage area is permanently stabilized.
- Make necessary repairs to ensure the basin is operational and performing properly.

SC-10 SEDIMENT TRAP

Refer to: ITD Standard Specifications, Section 212.
ITD Standard Drawings P-1-C, P-1-D, and P-4-A.



Standard Symbol

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☐ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☒ **Stream Protection**
- ☐ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

A sediment trap is a temporary containment area that allows sediment in collected stormwater to settle out during infiltration or before the runoff is discharged through a stabilized spillway. Sediment traps are formed by excavating or constructing an earthen embankment across a waterway or low drainage area.

Appropriate Applications

- Sediment traps may be used on construction projects where the drainage area is less than 5 acres. Traps should be placed where sediment-laden storm water enters a storm drain or watercourse.
- This BMP may be implemented on a project-by-project basis with other BMPs when determined necessary and feasible by the Engineer.
- As a supplemental control, sediment traps provide additional protection for a water body or for reducing sediment before it enters a drainage system.

Limitations

- Requires large surface areas to permit infiltration and settling of sediment.
- Not appropriate for drainage areas greater than 5 acres.
- Only removes large and medium sized particles and requires upstream erosion control.
- Attractive and dangerous to children, requiring protective fencing.
- Not to be located in live streams.
- Size may be limited by availability of right-of-way.

Design Parameters

- Sediment traps shall be constructed prior to the rainy season and construction activities.
- Trap shall be situated according to the following criteria: (1) by excavating a suitable area or where a low embankment can be constructed across a swale, (2) where failure would not cause loss of life or property damage, and (3) to provide access for maintenance, including sediment removal and sediment stockpiling in a protected area.
- Trap shall be sized to accommodate a settling zone and sediment storage zone with recommended minimum volumes of 67 and 33 cubic yards per acre of contributing drainage area, respectively, 0.5 inch of runoff volume over a 24-hour period. Multiple traps and/or additional volume may be required to accommodate site-specific rainfall and soil conditions.
- Traps with an impounding levee greater than 5 feet tall, measured from the lowest point to the impounding area to the highest point of the levee, and traps capable of impounding more than 35,300 cubic feet, shall be designed by a professional Civil Engineer registered with the state of Idaho. The design must be submitted to the Engineer for approval at least 7 days prior to the basin construction. The design shall include maintenance requirements, including sediment and vegetation removal, to ensure continuous function of the trap outlet and bypass structures.
- Areas under embankments, structural works, and sediment traps shall be cleared and stripped of vegetation.
- Rock or vegetation shall be used to protect the trap outlets against erosion.
- Fencing shall be provided to prevent unauthorized entry.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- If captured stormwater has not completely infiltrated within 72 hours, then dewater the sediment trap.
- Repair damage and remove obstructions as needed or as directed by the Engineer.
- Remove accumulated sediment when the volume has reached one-third the original trap volume.
- Properly dispose of sediment and debris removed from the trap.

SC-11 TEMPORARY CONSTRUCTION ENTRANCES

Refer to: ITD Standard Specifications, Sections 104, , 205, & 212.
ITD Standard Drawings P-1-F.

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☐ **Borrow and Stockpiles**
- ☐ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☐ **Stream Protection**
- ☒ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

A temporary sediment removal device made of a pad of crushed stone or rock at the approach from a temporary road to a public road or a detour. This BMP is used to limit tracking of mud off of temporary unpaved roads

Appropriate Applications

A stabilized construction entrance should be considered where:

- Vehicles are entering or leaving a construction site to a public road.
- Any unpaved entrance or exit where there is risk of tracking mud or sediment to the public road.

Limitations

- Management measures may not be needed for entrances or approaches solely contained within the construction site.
- Linear construction may result in limited right-of-way. Adequate control of sediment track-out may require additional measures.

Design Parameters

- At sites where volume is high, the entrance shall be wide enough to pass two vehicles and shall have an adequate turning radius where it meets existing roads.
- Geotextile, if required, shall be installed on properly prepared surfaces prior to placement of aggregate. Place aggregate at sufficient depth to support heavy equipment and protect

existing pipe culverts from crushing. The material and geotextile shall be removed after use and prior to placement of the final aggregate layer(s).

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Remove temporary construction entrances after they are no longer needed.
- Consider wheel washing (SC-13) and/or street sweeping (SC-4) if track-out is not being prevented.
- Make adjustments as necessary and have accumulated sediment and other debris removed and disposed of properly.
- At the end of construction, return to natural conditions using permanent erosion and sediment control BMPs. Remove or stabilize trapped sediment and permanently stabilize disturbed areas.

SC-12 TEMPORARY ROADS

Refer to: ITD Standard Specifications, Sections 104, 107, 205, & 212.
ITD Standard Drawings P-1-F and P-1-G.

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☐ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☐ **Stream Protection**
- ☒ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

Paved or unpaved temporary roads or detours shall be designed and address erosion and sediment movement in accordance with the BMPs and NPDES Permit.

Appropriate Applications

Location of temporary roads greatly aid in controlling erosion. Other erosion control measures such as sloping, rolling dips, water bars, aggregate, level spreaders, water or chemicals for dust control, and culverts in conjunction with temporary roads may be appropriate.

Temporary road management measures should be applied to the following situations:

- On all associated haul roads within a construction site, especially where fugitive dust needs to be controlled.
- Where traffic will be detoured onto unpaved areas.
- Where temporary roads may need to access sensitive areas such as wetlands or live streams.
- Where temporary roads are needed for access to bridge sites constructed ahead of excavation.

Limitations

- Structures, such as water bars, road sloping, rolling dips and level spreaders are generally limited to low traffic volumes.
- Temporary constructed roads that encroach on jurisdictional wetlands require the appropriate permits.

Design Parameters

- Locate temporary roads to minimize erosion impacts. Design temporary roads to access sensitive areas at specific locations to minimize impacts. Design of other erosion control measures shall be site-specific.
- At sites where traffic volumes are high, ensure that the entrance and roadway is wide enough for two vehicles to pass safely. Provide for adequate turning radius for all entrances where it meets existing roads.
- Where appropriate, use geotextiles prior to placement of aggregate, especially at construction entrances. Place aggregate at sufficient depth to support heavy equipment and protect existing pipe culverts from crushing.
- Detour runoff from a stabilized area to a sediment basin or other sediment control measure.
- Increase the road grade coming out of a rolling dip for a distance of 20-40 feet to terminate the rolling dip. (A rolling dip consists of a drivable transverse ditch constructed across the road. The rolling dip should be at a skew angle (30-40 degrees) to the centerline of the road.) Use a structure to receive the flow and control erosion at the outlet of the rolling dip.
- Do not use box culverts over the winter.

Construction Guidelines

- Adequately slope temporary roads for good drainage, and install all other structures such as water bars, culverts, and rolling dips, according to plans and specifications.
- Do not use road sloping on grades steeper than 5 percent unless other structures are also used. If road is steeper than 5 percent, use gravel surfacing to minimize erosion, and slope the road to the side that has a ditch.
- Make field adjustments, as necessary, to ensure proper performance.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Make adjustments based on inspections and have accumulated sediment and other debris removed and disposed of properly.
- At the end of construction, re-contour to original slope and return to natural conditions using permanent erosion and sediment control BMPs. Remove or stabilize trapped sediment and permanently stabilize disturbed areas.

SC-13 ENTRANCE/ OUTLET TIRE WASH

Refer to: ITD Standard Specifications, Section 621.
ITD Standard Drawing P-3-E.

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☐ **Borrow and Stockpiles**
- ☐ **Drainage Areas**
- ☒ **Sediment Trapping**
- ☐ **Stream Protection**
- ☐ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

Tire wash stations can be located at stabilized construction egress points to remove sediment from tires and under-carriages, and to prevent sediment from being transported onto public roadways.

Appropriate Applications

- Tire washes may be used on construction sites where dirt and mud tracking onto public roads by construction vehicles may occur.
- This BMP may be appropriate when stabilized ingress/egress points and construction roads are not sufficient in preventing sediment tracking onto adjacent roads or highways or in Environmentally Sensitive Areas (ESAs).
- Tire and vehicle washing may also be required to prevent the spread of noxious weeds. Refer to the contract documents to verify compliance with noxious weed requirements.

Limitations

- Requires a supply of wash water. Potential sources include existing water service connections if available, fire hydrants, or temporary water storage tanks. The Contractor shall verify that the use of any municipal or other existing water service is allowable with the appropriate agency.
- Requires a turnout or doublewide exit to avoid having entering vehicles drive through the wash area.
- No soaps or solvents allowed.
- Treat water with an appropriate control prior to discharge.

Design Parameters

- Construct on level ground, when possible, on a pad of coarse aggregate. A geotextile fabric shall be placed below the aggregate.
- Design the wash rack for anticipated traffic loads.
- Provide a drainage ditch that will convey the runoff from the wash area to a sediment-trapping device. See SC-10 (Sediment Trap) for additional guidance regarding sediment traps. The drainage ditch shall be of sufficient grade, width, and depth and adequately stabilized to safely carry the wash runoff.
- Require that all employees, subcontractors, and others use the wash facility as appropriate.
- Implement SC-4 (Street Sweeping and Vacuuming) as needed.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Remove accumulated sediment in wash rack and/or sediment trap to maintain system performance and dispose of as required.